● Nelson Zagalo
Braga (Portugal)

Requested: 2009-10-07 / Received: 2010-01-12
Accepted: 2010-05-28 / Published: 2010-10-01
DOI:10.3916/C35-2010-02-06

Creative Game Literacy. A Study of Interactive Media Based on Film Literacy Experience

Alfabetización creativa en los videojuegos: comunicación interactiva y alfabetización cinematográfica

ABSTRACT

In this study we have analysed the current state of media literacy focusing on the game and film art forms. We aim to discover if some problems found throughout the history of film literacy were also occurring in game literacy research. It is also our intention to bring both visions together in order to get the attention of people working in the gaming field. To do this we have studied the cultural and creative dimensions in game literacy. The study is defined culturally by educational and critical approaches, and creatively by design and programming. The study also takes into account film literacy perspectives. We found that game literacy has a strong bias towards the cultural rather than the educational approach. The critical component might face the same problems that occur in film literacy studies. In terms of the creative dimension, we found a lack of investment in and support for research in design and programming practices. In conclusion we believe more interest needs to be generated in game literacy and that the literacy perspective based on creative design and programming with an emphasis on communication instead of education should be the model to follow.

RESUMEN

En este estudio hemos analizado el estado actual de la alfabetización mediática prestando especial atención al cine y los videojuegos. Hemos intentado analizar si algunos de los problemas encontrados a lo largo de la historia de la alfabetización cinematográfica han existido también en el proceso de la alfabetización en los videojuegos, intentando unificar ambas visiones para captar la atención de las personas que trabajan en el campo de los videojuegos. Para ello, el estudio abarca la alfabetización en los videojuegos en dos dimensiones, la dimensión cultural y la dimensión creativa. La dimensión cultural se define a partir de los enfoques críticos y educacionales y la creativa mediante el diseño y la programación. Estas investigaciones se han llevado a cabo sin dejar de lado la perspectiva de la alfabetización cinematográfica. Hemos descubierto que la alfabetización en los videojuegos tiene una fuerte tendencia hacia el enfoque cultural, sobre todo la vertiente educativa, y que los riesgos que plantea el enfoque crítico presentan problemas similares a los que se registran en los estudios sobre el cine. En cuanto a la dimensión creativa, hemos advertido una falta de inversión para el estudio y la investigación de prácticas de diseño y programación. En conclusión, creemos que la alfabetización en los videojuegos necesita un nivel de motivación. Estimamos urgente la implantación de una perspectiva de alfabetización basada en el diseño creativo y la programación, poniendo especial énfasis en el desarrollo del enfoque comunicativo.

KEYWORDS / PALABRAS CLAVE

Videogames, film, literacy, creativity, media, interactivity, edutainment, entertainment.
Videojuegos, películas, alfabetización, creatividad, medios de comunicación, interactividad,

◆ Ph.D. Nelson Zagalo. Assistant Professor at the Center for Communication and Society Studies of the Universidade do Minho (Braga-Portugal) (nzagalo@ics.uminho.pt).
Text Review: Noel Byde

1. Introduction

The definition of literacies as common code for creating understanding between sender and receiver makes them an essential element in communication, even more so, for where there are no literacies, there is no communication. Literacies are everywhere and in all kinds of message transmission, even if we do not perceive them, establishing the basic terrain for communication. Non-verbal language was our first system, developed by nature and cognitive evolutionism. Then came the need to understand these non-verbal acts, to analyze and classify them, to codify the message in order to enable our species to raise levels of knowledge awareness. The first codification was done through speech, and after that we invented writing. We have built systems (different alphabets) capable of registering and translating speech effectively, and hence communication.

As Kerchove (1995: 256) puts it: «Writing gives us the ability to archive, expand and explore knowledge as symbolic and practical control over nature». The alphabet code represents basic abstract units which are meaningless alone. This atomization of the language, of the communication process, allowed us to build a system capable of creating and preserving new knowledge. With the preservation of ideas assured by that code, we freed our brains to invest more time in the innovation of ideas and less in having to remember.

Thus the main goal for any new literacy must be the capacity to increase knowledge, a more efficient understanding of the world. And to create this possibility, we first need to be able to present a code that defines the way subjects will communicate, read and write the message.

The main problem we have identified in media literacy is the lack of a code. The proposition adopted by the Charter for Media Literacy, supported by a UK[1] task force and a broader European[2] group, presents us with a model that overemphasises the understanding and interpretation of content. This charter presents the so-called Three Cs model – Cultural, Critical and Creative, with cultural context and critical awareness too centred on the message content and less on the structuring of the message, leaving too little space for creative activity, which needs a structural form, a code.

In this study we will examine the problems raised by the lack of proposals for understanding content messages within media literacy, specifically game and film literacy, and present a model to re-centre the literacy on the structures of knowledge creation proposed by new media.

2. Material and methods

Acting as consultants for the Second European Congress on Media Literacy in 2009, acting as expert consultants for the field of videogame development opened us to an entire landscape of the principle elements behind media literacy: main theories, actors, research fields involved, concurrent approaches, industry interests, bias and deficiencies in arguments. These elements serve as base material, together with a thorough evaluation of literature, for our research into the new media literacies, primarily of games. Even though it was a media congress, we saw little European research and investment in games studies, most of the emphasis on the digital age being on the Internet and the Web 2.0.

The rationale of this study is based on the current complexities experienced by research into media literacy as it struggles to find the right approach, the right balance in order to take the results onto the next level, their adoption by the education system. Media literacy is debating models and propositions for the use of media in schools, methods to present different media as learning objects. The discussion is about the continued prominence of text, and it defends the introduction of other media channels based on changes that have occurred in society in the past decades.

To support the objectives of the media literacy debate, we will discuss research models of the specificity of game literacy dividing the discussion into two parts: the cultural dimension, which will consist of the educational approach (Prensky, 2001; Gee, 2005; Squire, 2007) and the critical approach (Zagal, 2008; Lacasa, 2009); the creative dimension, which will be developed through design and programming experiences (Buckingham & Burn, 2007).

Our proposal for a game creative literacy will then emerge naturally out of the current state of society, which is immersed in Web 2.0 participation, knowledge-sharing and a creative logic offered by new media.

3. Results

The problem here is that in the past decades there has been too much emphasis on the first two Cs – the cultural and the critical – too much concern with the understanding of media as a message, mostly forgetting the medium, form and structure. Film literacy has championed this for the last 30 years. With the hunger to build a grammar (Metz, 1971) and the frustration of not being able to do so, film studies moved on to discussions about the interpretation of the message in film through theories of feminism, marxism, psychoanalysis, semiotics. And this continued throughout the his-

tory of film studies in the last century (Grønstad, 2002) with the aim of constructing a grand theory of film. Different branches of knowledge such as biology, neurosciences, ecology and evolutionism deployed once again to build new theories with little or no relation at all to the film object.

It was only with Bordwell (1985) that we saw the first glimpse of a change of direction, shifting the interest in building a grand theory and explaining everything about film towards problem-driven research. Bordwell came armed with psychology, but the main point was that the approach now seemed more like a design research process to find solutions to real, specific problems of film artworks. Bordwell (1989) presented his theories on historical poetics against the SLAB (Sausurre, Latour, Althusser and Barthes) film approach, where interpretation and meaning attribution was central. Bordwell was more interested in film as communication and art form and in finding structures, principles, patterns –the stylistics– through an historical analysis of movies.

> The main goal for any new literacy must be the capacity to increase knowledge, a more efficient understanding of the world. And to create this possibility, we first need to be able to present a code that defines the way subjects will communicate, read and write and read the message.

3.1. Educational approach

In this decade, games and interactive media have been accused of doing bad (NEA, 2004; Rich, 2008; Macintyre, 2009) and good (Gee, 2003; Johnson, 2005) according to two different perspectives on social impacts. Books and reading still possess strong values, unreachable for film or games, just as film and games enable experiences that are inaccessible to books.

In literature, the main goal of the writer is to tell the narrative in the greatest detail in order to develop a strong fabula or mental story in the receptor's mind. In film, the narration gains new media terrain by making it possible to show instead of tell (Mamet, 1992). Film does not need to spend time explaining details because they are shown. The story world comes ready-built to the receptor, proposing direct perception of the visual world that enhances perceptive emotions and so, learning. With games, storytelling activates a complete new set of cognitive activities and learning possibilities. The story is no longer an act of telling, or showing but an integrated set of active participations, of doing. Games media open a new space (virtual) for the mediation of knowledge, for the enhancement of knowledge construction in the receptor, through the well-known mode of learning by doing (Aldrich, 2005). Games can then use all the force behind storytelling mechanics, making use of a strong combination of tell, show and do. The receptor is no longer just a receptor but also a participator. The story containing learning messages will evolve only through the actions of the participator. Learning becomes a task to be memorized through completed actions, using body perception instead of mental learning situations alone. However, the hierarchy presented here, from literature down to film and games, which seems to evolve in one direction only with its interest in learning, can be seen in reverse when talking about the power of imagination.

One method used to communicate educational content is storytelling. This method involves specific processes of inference on the part of the receptor, processes that involve active and associative thinking (Bordwell, 1985). We make sense of the world through patterns that help us in the associative process of finding the right concept in our brain database (Koster, 2005: 25). When we see someone in a film scene entering an elevator, and in the next scene coming out of the elevator, we mentally fill in what happened between the two scenes with our assumptions, we don't ask what happened, or where the character comes from. The same happens for almost all missing information, or information deliberately not given to the receptor to create an active hypothesis testing process (Bordwell, 1985: 31). In this process, we elaborate various hypotheses to supply the missing information and we test them mentally throughout the process of storytelling until each hypothesis is proved or disproved.

So, it is not difficult to understand the involvement required to answer correctly the hypotheses our brain poses when reading a book, seeing a film and playing a game. In each of these media we use the exact same process, the difference is in the amount of information given or not given to the receptor. In a book, if the aut-

hor does not say the sun is shining or if the sky is gray, the reader will have to create a mental image choosing to depict a sunny or gray day through the process of hypothesing in accordance with other cues picked up in the text. In film and games, the day is sunny or gray and is actually represented in the scene. Also, when it comes to understanding the effect of how to perform some action, such as driving a car in a robbery, the reader will have to call on all his imagination to give life to the scene, bring together all his previous moments of tense driving, with possible scenes of movies and games, to establish hypotheses about streets, signals, obstacles, buildings, etc. On the other hand, games' conveyance of the message is almost direct, with almost identical physical sensations through visuals, sounds and touch (with the driving wheel) requiring little imagination from the player to recall those tense driving moments.

We propose an approach for game literacy with two focuses: the understanding of games, which we define as the decoding of what games are; and the design of games. Instead of media literacy's Triple C – Cultural, Critical and Creative – which we have demonstrated to be biased toward culture and criticism, we believe the most important factors for game literacy should be defined as a double D – Decode and Design!

Having discovered the potential in games for transmitting knowledge, researchers of game education then followed the serious games route. This conceptual approach to games has no interest in entertaining the player but only to teach specific content and transmit a specific set of learning messages, independently of the structure, form and gameplay used. Serious games «aim at providing an engaging, self-reinforcing context in which to motivate and educate the players» (Kankaanranta & Neittaanmäki, 2009), which explains the serious label. The goal is to reinvent learning in school «more game-like in the sense of using the sorts of learning principles that young people see in good games every day» (Gee, 2005). Or as Shaffer & al. (2005) put it: «We need to leverage these understandings to build games that develop for players the epistemic frames of scientists, engineers, lawyers, and other valued communities of practice».

This research approach looks at games as a kind of magic powder for education. Nine years ago, Microsoft engaged with the Comparative Media Studies group at the MIT to develop the Games-To-Teach project and in the launch statement read: the Games-to-Teach Project hopes to offer students a chance to explore the worlds of math, science, and engineering through new and exciting game models[3]. The results of this project were summarised in the paper Design Principles of Next-Generation Digital Gaming for Education (Squire & al., 2003) presenting superficially seven principles for the creation of games to teach. This is nothing new. In the 1990s with the appearance of the CD-ROM and more complex games graphics we had another boom in interest in creating games for learning, then labelled interactive edutainment. As argued by Egenfeldt-Nielsen (2006), edutainment goes back to the 1980s, and since then, if we look back at the overall research on the subject, «it has to be said that the current findings on learning outcome are positive and promising. Some skepticism is warranted, however, because the lack of control groups, researcher bias, weak assessment tests, and short exposure time is not addressed sufficiently». The beginning of this century saw a decline in interest in this segment of games (Prensky, 2004) due to the identification of certain problems: the short duration of lessons to envelop game experiences; physical space; students' game competences and teachers' preparation (Egenfeldt-Nielsen, 2006; Squire, 2007).

The lack of confidence in research results and decline in edutainment user motivation led Egenfeldt-Nielsen to with serious games. However, the question remained unanswered and Prensky (2001a) synthesizes this in the following example: «In geography – which is all but ignored these days– there is no reason that a generation that can memorize over 100 Pokémon characters with all their characteristics, history and evolution can't learn the names, populations, capitals and relationships of all the 101 nations in the world».

In our perspective, the problems related to edutainment stated by (Egenfeldt-Nielsen, 2006; Squire, 2007) are still valid in the serious games approach, when specifically talking about using them in schools.

This is a motivational question more than anything, and Prensky (2002) recognizes this.

Nevertheless, we believe that we can learn with games. Games are very good for training because games are grounded in simulation. Simulation is one the best ways to train – just ask airplane pilots, fire workers, etc. However, simulation doesn't work if there is no motivation, and even worse, it doesn't work in all domains. Games and simulation are good for training external actions, as acknowledged by Gee in the importance of video games as «action-and-goal directed simulations of embodied experience», and as argued by Prensky (2001b) in relation to the success of learning, «practice –time spent on learning– works». Both views are true and exemplify the problem we have, that not everything can be learned through external practice. The question is how to build a 3-D action game or simulation to reach the depths of interpretation we reach by reading the poetry of Fernando Pessoa, the speech by Socrates on his suicide or even Kubrick's «2001: A Space Odyssey» (1967) or Tarkovsky's «Solyaris» (1972). Interactive devices, such as games and simulations, are bad at portraying drama, melancholy and the depths of the human condition in general (Zagalo, 2007). Games are good at teaching external abstractions like math and physics but bad at representing introspection and philosophy.

3.2. The critical approach

This represents a new approach for game education more in the vein of current media and film literacy trends[4]. Regarding the projects that failed to create specific interactive edutainment, the approach here is not to change or transform in anyway those commercially available games, but instead to use them as is in classrooms, as in the BFI project «Screening Shorts» by Mark Reid (2005). Here Reid creates guidelines on how to use short commercial films in order to «provide engaging and stimulating material through which concepts such as genre, representation, narrative structure and characterization can be explored and understood».

As a hypothetical example, to teach about the impact and effects of controlled societies we could take George Orwell's 1984 (1948), the movie «Dark City» by Alex Proyas (1998) or the videogame «Half-Life 2» by Valve (2004). These are commercial products from three different branches of literacy that can stimulate different receptions in students. However, if conceptually guided by a teacher the intended content message can be transmitted much more richly. The three different accesses to modes –book, movie and game– enable greater student envelopment with the subject under study.

This approach has been tested in a collaborative project, «Aprendiendo con los Videojuegos» (2006)[5], between Electronic Arts Spain (EA) and the University of Alcalá (Spain). In the presentation of the project, the students enrolled in the experience refer to playing games in classrooms as a way for them to «learn how to think, how to create and how to imagine». In the workshops developed by the research team there was an emphasis on teamwork among students, teachers and even parents; on decoding images and sounds; and on a more in-depth distinction between fiction and reality. As argued by project director Lacasa et. al. (2009), the goal was «to explore how commercial videogames can help to construct innovative educational opportunities in the classroom».

Since 2006, the John D. and Catherine T. MacArthur Foundation in the United States has provided $50 million to fund a five-year project on Digital Media and Learning[6]. The results of this project are published by the MIT Press and are available in open access electronic versions[7]. The goal, as stated in the preamble of the MIT book series, is to examine «the effect of digital media tools on how people learn, network, communicate, and play, and how growing up with these tools may affect peoples sense of self, how they express themselves, and their ability to learn, exercise judgment, and think systematically». This project has wider media scope than games, centred on the domain of the digital and interactive media, but the general guidelines of the project are similar to those of the EA-Alcalá University Project, to study and use media as is in order to teach.

The main potential problem we identify when it comes to understanding the goals of this approach, and taking game media into account is the grand theory» of film studies previously described. To get round these concerns, and also following the current trend for the development of university courses on videogames, some propositions have been presented in the past two years such as the framework proposed by Zagal (2008) that aims to «contextualize what it means to understand and learn about games». Zagal develops an argumentation around the meaning of games as artworks, presenting guidelines to help students to understand what videogames are.

3.3. Design and programming approaches

The creative variable is grounded in these two game components – design and programming. The design of a game is considered to be the core element.

This is recognized by the industry, as opposed to film where the author is called a director. In games, the author is the designer (ex. Shigeru Miyamoto or Peter Molyneux). The author is the person behind the main idea, the structure of the game and thus needs to think logically. That said, a game designer must be able to draw up a game structure to establish its rules, obstacles and choices, and must be able to put it to work. That is why Leblanc (2008: 85) advises designers to «learn to program»; he says that «designing a game without know how to program is like painting without a brush». For Zimmerman (2008: 24), game design must be at the centre of any game literacy and should be defined as «the ability to understand and create specific kinds of meaning» making use of games.

Research into the creative dimensions is scarce when compared to the cultural dimension, but the same is also true in film studies. To counteract this, we have three projects (Robertson and Good, 2005; Buckingham and Burn, 2007; Peppler & and Kafai, 2007) that worked on game literacy from the perspective of designers and programmers, doing experiments with children that required them getting involved in game creation. Robertson and Good (2005) used the game engine, Aurora, from the videogame «Neverwinter Nights» (2002) which allows a very fast and easy transformation of the existing game environment. Buckingham and Burn (2007) worked with a game company to develop a specific game engine, MissionMaker1, to make game design and programming highly accessible. And Peppler and Kafai (2007) used their own visual programming language Scratch, which is well-known for easy creation of interactive media devices.

In these three experiments, levels of motivation and self-esteem among participants were very high, as demonstrated by the positive descriptions of children's behaviour during practice: «the strong motivational effect this workshop had on the young people (...) they became engrossed in the games design task and it was very difficult to persuade them to stop working and take breaks» (Robertson & Good, 2005); «the pleasure of production» (Buckingham & Burn, 2007) children felt; «a dramatic shift in Jorge's [children designer] participation» (Peppler & Kafai, 2007) in social groups.

As we can see from these three research experiments, motivation and engagement in learning was made possible through the use of the right set of tools, and setting free the kids' imagination. As opposed to playing an educational game, motivation arises from the will to create something and being empowered to invent, something akin to the sensations we get from self-realization. Also, being a challenging task carried out among peers, motivation ties in with closer social ties. These descriptions are in line what happens with the teaching of film in workshops when it comes to motivation. Students engage themselves completely in order to realize their visions in moving pictures.

4. Interactivity and creation

One significant problem that game literacy shares with film literacy, which explains the current emphasis on cultural and critical aspects, is that even though it defines a form of communication and has a specific language, it is very difficult to synthesize a structural code for it. As Metz found out when building a grammar for film like the one we have in linguistics, it is impossible to achieve mainly because audiovisual communication does not conform to the same rules as text. Text was invented and represents reality through abstractions, whereas film represents reality through capturing visuals and sounds from reality, even if we can conceptually define this reality as an illusion (Bazin, 1945). For games, reality might stand between text and film when considering worlds that are graphically constructed, but by using interactivity it enhances the realism even more because it is achieved through the simulation of the world of action.

Hence with interactivity as a singularity of games, and with the difficulties in creating a language or code, learners learn by doing, by trying, by experimenting, and by mixing different sets of knowledge. And this is at the heart of creative game literacy, strongly grounded in a transdisciplinary design process. With the power of interactivity translated into situated cognition, and avoiding reductionism to any other media, experience through simulation can imprint somatic sensations onto the learner's body and mind, thus generating a new culture of learning based on the crafting of world simulations as mirrors of the way we understand reality.

Therefore, we propose an approach for game literacy with two focuses: the understanding of games, which we define as the decoding of what games are; and the design of games. Instead of media literacy's Triple C – Cultural, Critical and Creative – which we have demonstrated to be biased toward culture and criticism, we believe the most important factors for game literacy should be defined as a double D – Decode and Design!

Notes

[1] Check the website: www.medialiteracy.org.uk.

[2] Check the website: www.euromedialiteracy.eu.

[3] The letter can be accessed at www.educationarcade.org/gtt/-newsfall2001.html.

[4] The Evens Foundation awarded the Evens Prize for Intercultural Education 2009 prize to the British Film Institute for its work in creating guides on teaching how to use commercial fictional film shorts in schools.

[5] The official web page provides more information on the specificities of the Project. (www.aprendeyjuegaconea.net/uah).

[6] The webpage for this project is: http://digitallearning.macfound.-org.

[7] The open access to the book series is on the MIT Press website for the series (http://mitpress.mit.edu/catalog/browse/browse.asp?-btype=6&serid=178).

[8] Check the website www.kar2ouche.com/missionmaker.

References

ALDRICH, C. (2005). *Learning by Doing: A Comprehensive Guide to Simulations, Computer Games, and Pedagogy in e-Learning and Other Educational Experiences*. San Francisco (USA): John Wiley & Sons, Inc.

BAZIN, A. (1945). *Ontologia da Imagem Fotográfica. In O que é o Cinema?* Lisboa: Livros Horizonte; 1992; 13-21.

BORDWELL, D. (1985). *Narration in the Fiction Film*. Madison, WI: University of Wisconsin Press.

BORDWELL, D. (1989). Historical Poetics of Cinema, in PALMER, R.B. (Ed.). *The Cinematic Text: Methods and Approaches*. New York, AMS Press; 369-398.

BUCKINGHAM, D. & BURN, A. (2007). Game literacy in theory and practice. *Journal of Educational Multimedia and Hypermedia. 16 (3);* 323-349.

GEE, J.P. (2005). Good Video Games and Good Learning. *Phi Kappa Phi Fórum, 85 (2);* 33-7.

GEE, J.P. (2003). *What Video Games have to Teach us about Learning and Literacy.* New York: Palgrave Macmillan.

GRØNSTAD, A. (2002). The Appropriational Fallacy: Grand Theories and the Neglect of Film Form, In *Film-Philosophy, 6, 23* (www.film-philosophy.com/vol6-2002/n23gronstad).

JOHNSON, S. (2005). *Everything Bad is Good for You*. London: Penguin Books.

KANKAANRANTA, M. & NEITTAANMÄKI, P. (Eds.) (2009). *Design and Use of Serious Games.* Dordrecht: Springer. Intelligent Systems, Control and Automation: Science and Engineering, 37.

KERCKHOVE, D. (1995). A Pele da Cultura. Relógio d'Água: Lisboa.

Egenfeldt-Nielsen, S. (2006). Overview of Research on the Educational Use of Video Games, in *Digital Kompetanse, 3, 1;* 184-213.

KOSTER, R. (2005). *A Theory of Fun for Game Design*. Arizona (USA): Paraglyp Press.

LACASA, P.; MARTÍNEZ, R. & CORTÉS, S. (2009). Real and Virtual Play in NBA Live 07: Sport Videogames as Educational Tools, in *Proceedings of Videojogos 2009*. Aveiro: November, 26-27.

LEBLANC, M. (2008). *Designer Perspective: Marc Leblanc, in Tracy Fullerton, Game Design Workshop.* USA: Morgan Kaufmann.

MACINTYRE, B. (2009). The Internet is Killing Storytelling. *The Times, November 5*. (www.timesonline.co.uk/tol/comment/columnists/ben_macintyre/article6903537.ece) (30-01-10).

MAMET, D. (1992). *On Directing Film*. USA: Penguin.

METZ, C. (1971). *Language et cinema*. Paris: Larousse.

NATIONAL ENDOWMENT FOR THE ARTS (NEA) (2004). *Reading at Risk: A Survey of Literary Reading in America* (www.nea.-gov/pub/ReadingAtRisk.pdf) (30-01-10).

PEPPLER, K. & KAFAI, Y.B. (2007). What Video Game Making can Teach us about Learning and Literacy: Alternative Pathways into Participatory Culture. In BABA, A. (Ed.). *Situated Play: Proceedings. Third International Conference of the Digital Games Research Association (DiGRA)*. Tokyo: The University of Tokyo; 369-376.

PRENSKY, M. (2002). The Motivation of Gameplay. *On the Horizon, 10 (I)*.

PRENSKY, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon. 9, 5,* October. MCB University Press (www.marcprensky.-com/writing/Prensky%20%20Digital%20Natives,%20Digital%20Immigrants%20%20Part1.pdf) (30-01-10).

PRENSKY, M. (2001b). Digital Natives, Digital Immigrants, Part II: Do They Really Think Differently? *On the Horizon, MCB University Press, 9, 6*, December.

PRENSKY, M. (2004). *The Emerging online Life of The Digital Native.* Prensky Website (www.marcprensky.com/writing/Prensky-The_Emerging_Online_Life_of_the_Digital_Native-03.pdf).

REID, M. (2005). *Screening Shorts.* BFI, Palgrave Macmillan (www.bfi.org.uk/education/teaching/screeningshorts).

RICH, M. (2008). The Future of reading, Literacy Debate: Online, R U Really Reading? *New York Times* (www.nytimes.com/2008/-07/27/books/27reading.html) (27-07-08).

ROBERTSON, J. & GOOD, J. (2005). Story Creation in Virtual Games Worlds- *Communications of the ACM, 48, 1* (doi 10.1145/10-39539.1039571

SHAFFER, D.W.; SQUIRE, K.D.; HALVERSON, R. & GEE, J.P. (2005). Video Games and the Future of Learning. *Phi Delta Kappan, 87(2);* 104-111.

SQUIRE, K. & al. (2003). Design Principles of Next-Generation Digital Gaming for Education. *Educational Technology, 43, 5;* 17-23.

SQUIRE, K. (2007). *Video-Game Literacy, A Literacy of Expertise.* University of Wisconsin-Madison (http://website.education.wisc.-edu/kdsquire/tenure-files/04-video-game%20literacy.pdf) (30-01-10).

ZAGAL, J.P. (2008). A Framework for Games Literacy and Understanding Games, in *Proceedings of Future Play 2008;* November 3-5. Toronto (Canada).

ZAGALO, N. (2007). *Convergência entre o Cinema e a Realidade Virtual (Convergence between Film and Virtual Reality)*. Universidade de Aveiro: PhD Thesis, Departamento de Comunicação e Arte.

ZIMMERMAN, E. (2008). Gaming literacy: Game Design as a Model for Literacy in the Twenty-First Century. In PERRON, B. & WOLF, M.J. (Eds.). *The Video Game Theory Reader 2*. New York: Routledge; 23-31.